

Sub 22  
22 (Twice Amended) A wiper blade employed in a machine other than an image forming apparatus and having a portion to be in contact with water and a window pane of the machine, said portion being made of an organic polymer material selected from a group including resin and rubber, and said portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a water repellency, and having a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of said portion.

**REMARKS**

The Office Action dated October 23, 2002 has been received and carefully noted. The above amendments and the following remarks are submitted as a full and complete response thereto. By this Amendment, claim 23 has been cancelled and claims 18 and 22 have merely been amended to more clearly recite the claimed subject matter. No new matter is added. Accordingly, claims 18, 19, 21 and 22 are pending in this application and are submitted for consideration. Claims 1, 2, 4, 5, 7-12, 14 and 15 have been withdrawn from further consideration.

However, it is again noted that claims 1, 2, and 4 should also be considered since they are generic claims, as stated by the Examiner in the Office Action dated March 12, 2001. To date, Applicants have not received an Office Action addressing the subject matter of generic claims 1, 2 and 4. Therefore, Applicants respectfully request an Office Action addressing the subject matter of generic claims 1, 2 and 4.

Claim 18 was rejected under 35 U.S.C. §102(e) as being anticipated by Petrmichl et al. (U.S. Patent No. 5,618,619, "Petrmichl"). In making this rejection the Office Action took the position that Petrmichl discloses all the elements of the claimed invention. However,

Applicants respectfully submit that claim 18 recites subject matter that is neither disclosed nor suggested by Petrmichl.

Amended claim 18 is directed to a machine part selected from a group including an automobile part other than a tire, and a bicycle part other than a tire, having a portion to be in contact with another object. The portion is made of an organic polymer material selected from a group including resin and rubber. The portion has a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion.

The Office Action took the position that the prior art discloses all the elements of the claimed invention. However, it is respectfully submitted that the prior art fails to disclose or suggest the structure of the claimed invention, and therefore, fails to provide the advantages of the present invention. For example, the present invention is configured have a portion made of an organic polymer material selected from a group including resin and rubber having a flexible surface. A DLC (diamond like carbon) film is entirely or partly coating the flexible surface of the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion.

As a result of this claimed configuration, a good sliding property can be achieved with respect to the contact object because the carbon film has a high resistance against wear.

Petrmichl discloses a method of coating substrates. The substrate surface is etched and an abrasion-resistant coating is deposited on the substrate. A diamond-like carbon may be used as a top layer for the coating. However, upon review of Petrmichl, it is unclear as to where it is disclosed that a machine part is selected from a group including an automobile part other than a tire, and a bicycle part other than a tire, the part having a

portion in contact with another object, and the portion being made of inorganic polymer material selected from resin or rubber, the portion having a flexible surface entirely or partly coated with a diamond-like carbon coating, the diamond-like carbon film having a wear resistance, as recited in claim 18. It is also unclear as to where it is disclosed that the diamond-like carbon coating has a lubricity as well as a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as also recited in claim 18.

Therefore, as discussed above, because Petrmichl does not anticipate claim 18 or the present invention within the meaning of 35 U.S.C. § 102, Applicants respectfully request withdrawal of the rejection.

Claim 22 is rejected under 35 U.S.C. §102(b) as being anticipated by Minolta (JP 64-090484, "JP '484"). In making this rejection the Office Action took the position that Minolta discloses all the elements of the claimed invention. However, Applicants respectfully submit that claim 22 recites subject matter that is neither disclosed nor suggested by JP '484

Amended claim 22 recites a wiper blade employed in a machine other than an image forming apparatus, and having a portion to be in contact with water and a window pane of the machine, the portion being made of an organic polymer material selected from a group including resin and rubber, and the portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a water repellency, and having a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion.

However, unlike the present invention, Minolta merely discloses an image forming apparatus part, which is a cleaning blade, for cleaning residual toner on a photosensitive

member in an electrophotographic image forming apparatus. The part is made of an organic polymer material and coated with an amorphous carbon film.

Thus, Minolta fails to disclose or suggest a wiper blade used in a machine that is not an image forming apparatus, and having a portion in contact with water and a window pane of the machine, the portion being made of an organic polymer material selected from a group including resin and rubber, and the portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a water repellency, and having a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of said portion, as recited in claim 22.

Therefore, it is respectfully submitted that the Applicants' invention, as set forth in claim 22 is not anticipated within the meaning of 35 U.S.C. § 102.

Claim 23 is rejected under 35 U.S.C. §102(b) as being anticipated by Sumitomo (JP 2-197401, "JP'401"). In making this rejection the Office Action asserted that Sumitomo discloses all the elements of the claimed invention. By this Amendment, claim 23 has been cancelled. Therefore, the rejection is moot.

Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over JP '172 (JP 04-136172, "JP '172") taken in view of Nakahigashi et al. (U.S. Patent No. 5,562,952, "Nakahigashi") or TDK (JP 04-041672, "JP '672") or Yamazaki et al. (U.S. Patent No. 5,230,931, "Yamazaki") or Itoh (U.S. Patent No. 4,996,079) or Thaler (U.S. Patent No. 4,981,717). However, Applicants traverse the rejection, and as will be discussed below, respectfully submit that claim 19 recites subject matter that is neither disclosed nor suggested by any combination of the prior art.

Claim 19 recites a machine part selected from a group including hose, a sealing member, a pipe and or a sheet each employed in a machine, having a portion to be in

contact with another object, said portion being made of an organic polymer material selected from a group including resin and rubber, and said portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a gas barrier property and having a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of said portion.

In making this rejection, it was asserted in the Office Action that although JP '172 only discloses carbon coatings on pipes, Official Notice was taken that pipes made of polymer are well-known in the art. Nakahigashi, JP '672, Yamazaki, Itoh, or Thaler were cited for disclosing that a carbon coating is known on polymeric substrates to provide protection.

However, JP '172 only discloses a method of coating an inner surface of a pipe or a ball made of a non-metallic material such as quartz, alumina, silicon nitride or silicon carbide with a diamond by microwave plasma CVD. JP '172 fails to disclose or suggest a diamond like carbon coating a machine part made of an organic polymer material. The diamond like carbon coating is different from the diamond coating. (See for example, Petrmichl, column 5, lines 54-64).

Itoh discloses a method of depositing thin films consisting mainly of carbon. More specifically, Itoh teaches depositing a carbon material upon a surface such a semiconductor, glass, metal, ceramic and other such materials.

However, Itoh does not disclose or suggest a machine part including a hose, a sealing member, a pipe or a sheet, the part configured to have a portion made of an organic polymer material selected from a group including resin and rubber having a flexible surface, where a DLC (diamond like carbon) film is entirely or partly coating the flexible surface of

the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as recited in claim 19.

Thaler discloses a diamond like coating and method of forming the same. Specifically, Thaler discloses a diamond-like coating that is provided as a protective coating for sliding wear parts such as valves, pistons, and bearings. Thaler also discloses the film having a high degree of lubricity as well as hardness and durability.

However, Thaler does not disclose or suggest a machine part including a hose, a sealing member, a pipe or a sheet, the part configured to have a portion made of an organic polymer material selected from a group including resin and rubber having a flexible surface, where a DLC (diamond like carbon) film is entirely or partly coating the flexible surface of the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as recited in claim 19.

Nakahigashi discloses a plasma CVD method and apparatus wherein the generation of radicals that cause the generation of dust particles are suppressed without preventing the generation of radicals that contribute to film deposition.

However, Nakahigashi also fails to does not disclose or suggest a machine part including a hose, a sealing member, a pipe or a sheet, the part configured to have a portion made of an organic polymer material selected from a group including resin and rubber having a flexible surface, where a DLC (diamond like carbon) film is entirely or partly coating the flexible surface of the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as recited in claim 19.

Yamazaki discloses a plasma apparatus for depositing carbon material on a surface in accordance. However, Yamazaki also does not disclose or suggest a machine part including a hose, a sealing member, a pipe or a sheet, the part configured to have a portion

made of an organic polymer material selected from a group including resin and rubber having a flexible surface, where a DLC (diamond like carbon) film is entirely or partly coating the flexible surface of the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as recited in claim 19.

JP '672 discloses a process that controls the hardness of C membrane prepared by a plasma CVS process. However, JP '672 also does not disclose or suggest a machine part including a hose, a sealing member, a pipe or a sheet, the part configured to have a portion made of an organic polymer material selected from a group including resin and rubber having a flexible surface, where a DLC (diamond like carbon) film is entirely or partly coating the flexible surface of the portion and has a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion, as recited in claim 19.

Thus, Applicants submit that the combination of JP '172 and either Nakahigashi, Yamazaki, JP '672, Itoh or Thaler, fails to disclose or suggest a machine part selected from a group including a hose, a ceiling member, a pipe or a sheet each employed in a machine, having a portion to be in contact with another object, the portion being made of an organic polymer material selected from a group including resin or rubber, and the portion having a flexible surface entirely or partly coated with diamond-like carbon film having a wear resistance and lubricity as well as a gas barrier property and having a thickness exhibiting flexibility substantially conforming to the flexibility of the portion. Although the Office Action asserted that it would have been obvious to one of ordinary skill in the art to provide polymeric pipes with a protective carbon coating, it is unclear as to which portion the being equating as the claimed "portion."

Therefore, it is respectfully submitted that the Applicants' invention, as set forth in claim 19 is not obvious within the meaning of 35 U.S.C. § 103.

Claim 21 is rejected under 35 U.S.C. §103(a) as being unpatentable over NEC (JP 05-196864, "JP '864") in view of Nakahigashi, JP '672, Yamazaki, Itoh, or Thaler. In making this rejection the Office Action took the position that although JP '864 discloses the use of carbon coating on a diaphragm, JP '864 does not explicitly disclose carbon coating on polymeric diaphragms. The Examiner took Official Notice that diaphragms made of polymers are known in the art. Nakahigashi, JP '672, Yamazaki, Itoh, and Thaler were cited for showing that carbon coatings are known on polymeric substrates to provide protection.

Claim 21 recites a diaphragm of a diaphragm pump employed in a machine having a portion to be in contact with a liquid, the portion being made of an organic polymer material selected from a group including resin and rubber, and the portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a water repellency as well as a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion.

JP '864 only discloses a pressure sensor comprising a diaphragm, a strain gauge on the diaphragm and a supporting substrate, wherein the diaphragm is made of only a thin diamond film which is different from a diamond like carbon, as stated above.

Therefore, Applicants submit that the combination of JP '864 and either Nakahigashi, Yamazaki, JP '672, Itoh or Thaler fails to disclose or suggest a diaphragm of a diaphragm pump employed in a machine having a portion to be in contact with a liquid, the portion being made of an organic polymer material selected from a group including resin and rubber, and the portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a water repellency as well as a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of the portion.



Thus, it is respectfully submitted that the Applicants' invention, as set forth in claim 21 is not obvious within the meaning of 35 U.S.C. § 103.

In view of the remarks, Applicants respectfully request allowance of claims 18, 19, 21 and 22 together with generic claims 1, 2, and 4.

In view of the distinctions discussed above, withdrawal of the rejections is respectfully requested. Therefore, Applicants submit that the application is now in condition for allowance.

If this application is not in condition for allowance, the Examiner is invited to contact Applicant's undersigned attorney at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees, which may be required with respect to this paper to Counsel's Deposit Account 01-2300, **referencing docket number 107351-00001**.

Respectfully submitted,

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Enclosures: Marked-up Version of Amended Claims  
Petition for Extension of Time

**MARKED-UP VERSION OF AMENDED CLAIMS**

18. (Twice Amended) A machine part selected from a group including an automobile part[, a bicycle part, and image forming apparatus part] other than a tire and a bicycle part other than a tire having a portion to be in contact with another object, said portion being made of an organic polymer material selected from a group including resin and rubber, and said portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of said portion.

22. (Twice Amended) A wiper blade employed in a machine other than an image forming apparatus and having a portion to be in contact with water and a window pane of the machine, said portion being made of an organic polymer material selected from a group including resin and rubber, and said portion having a flexible surface entirely or partly coated with a DLC (diamond like carbon) film having a wear resistance and a lubricity as well as a water repellency, and having a thickness exhibiting flexibility substantially conforming to the flexibility of the surface of said portion.